

C l a i m s

1. Flexible riser for transfer of hydrocarbons between a sea bed installation and a vessel (10) floating at sea surface, the flexible riser (18) being intended to be submerged to position below the sea level when the riser (18) is disconnected from the vessel (10) characterized in that the riser (18) is provided with means (20) for protecting the riser (18) from impacts and wear, caused e.g. by drifting ice, the protection means (20) covering at least the part of the riser (18) being exposed to wave and being formed of a plurality of separate elements (23), the flexible riser (18) being retractable to an in-active, retracted position below the sea level when the riser (18) is not in operation.
2. Flexible riser according to claim 1, wherein the riser protection means (20) are suspended from the vessel (10).
3. Flexible riser according to claim 1, wherein the riser protection means (20) is suspended from a submerged turret buoy (19).
4. Flexible riser according to claim 1, wherein the riser protection (20) is suspended by means of chains or wires (21).
5. Flexible riser according to claims 1-4, wherein the riser protection (20) is formed by a plurality of separate hollow elements (35), each being suspended from the chains or lines (21).
6. Flexible riser according to claim 5, wherein the hollow elements (35) are truncated and conical with a smaller upper diameter and a larger lower diameter or vice versa.

7. Flexible riser according to claims 1-6, wherein the lower end of the riser protection means (20) is provided with mooring means for mooring the riser protection means (20) to the sea bed (16).

8. Flexible riser to claim 1-7, wherein the elements (35) forming the riser protection means (20) are stacked on top of each other when in a retracted position.

9. Flexible riser according to claims 1-8, wherein the riser protection means (20) may be completely retracted into sheltered position on the sea bed.

10. Flexible riser according to claims 1-8, wherein the riser protection means (20) may be completely retracted into a sheltered position onboard the vessel (10).

11. Flexible riser according to claims 1-10, wherein the riser protection means (20), at its lower end, is equipped with socket (22), intended to interact with mooring means located on the sea bed (16).

12. Flexible riser according to claim 11, wherein the lower ends of the suspending chains or wires are attached to the riser socket (22).

13. Flexible riser according to claim 12, wherein the socket (22) is provided with locking means (39) for securing the socket (22) in a locked position on the mooring means.

14. Flexible riser according to claim 13, wherein the locking means 39 is equipped with a release means, enabling the socket (22) to be released from the mooring.

15. Flexible riser according to claims 11-14, wherein the socket (22) has an downwardly protruding, conical shape intended to interact with a corresponding opening in the mooring means, thereby preventing the socket (22) from moving upwards.

16. Flexible riser according to claims 1-15, wherein the elements (35) are provided with internally arranged means for minimizing possible friction or load impact between the riser (18) and the protection means (20), enabling the riser (18) to move freely within the riser protection means (20).

17. Flexible riser according to claim 1-16, wherein each element (35) at its lower edge, is provided with a stacking ridge (37) enabling the element (35) to be stacked on a next element (35).